

Eggs and Egg Products

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if the diet contains some dried skim milk or dried buttermilk the yolks tend to be slightly larger than if these feedstuffs are not used.

The vitamin content of eggs may be affected by both diet and management. The content of vitamins A, B₁, G, and D in the egg can be increased by feeding diets that contain relatively large quantities of these vitamins. The better sources of vitamin A are cod-liver oil, certain other fish oils, alfalfa-leaf meal, alfalfa meal, and yellow corn.

One of the best sources of vitamin B₁ is dried yeast. Other good sources are the oil-seed meals and the byproducts of the milling of wheat for flour. The cereal grains are also good sources of this vitamin. The better sources of vitamin G are dried whey, dried buttermilk, dried skim milk, alfalfa-leaf meal, fish meal and the better grades of meat scrap. For increasing the vitamin D content of eggs, cod-liver oil, sardine oil, and certain other fish oils may be used. However, during the spring, summer, and autumn, chickens on range generally get a good supply of vitamin D from sunshine. The vitamin D content of the eggs of such chickens tends to increase appreciably from March to June but may decrease during the warmer months of the year because of the tendency of the chickens to seek shade when the weather is hot.

Should light-colored yolks be desired, the chickens should be confined in laying houses or in bare yards and fed a diet that contains little or no yellow corn and but little alfalfa meal or alfalfa-leaf meal. The richer shades of yellow may be obtained by feeding diets that contain as much yellow corn as possible and from 5 to 10 percent of alfalfa products. Deep orange-red yolks may be obtained by feeding 0.5 to 2.0 percent of ground pimiento pepper or chili pepper. Fresh green feed also tends to increase the color of the yolks; however, an excessive intake of green feed may cause the yolks to acquire an undesirable green-yellow or a red-yellow color.

It is best not to permit laying chickens to eat certain feedstuffs or plants. For example, if there is more than 5 percent of cottonseed meal in the diet, the yolks tend to become mottled if the eggs are stored for several months; also the whites may acquire a pink tinge. Certain plants, such as cheese weed, have a similar effect on the white. Shepherds-purse and field pennycress have been reported to produce a green color in both the white and the yolk. Many strongly flavored feedstuffs, such as turnips, onions, garlic, and leeks, sometimes produce undesirable flavors in eggs, especially if large quantities are consumed. Certain fish oils have also been found to produce a fishy flavor, but cod-liver oil or sardine oil of good quality ordinarily have no undesirable effect on the flavor of eggs, if fed at the proper levels.

USES OF INEDIBLE EGGS³²

A part but by no means all of the eggs that have lost their value for food go into industrial products. Printing, textile, and chemical plants use considerable quantities of them. Spoiled eggs, however, are a heavy loss to the poultry industry even though their value is a small fraction of that of edible eggs.

³² By R. W. Frey, senior chemist, and L. S. Stuart, associate bacteriologist, Industrial Farm Products Research Division, Bureau of Agricultural Chemistry and Engineering.

yolk must be guaranteed to contain not less than 9 percent of oil and more than 16 to 18 percent of salt. Salt-free yolk must contain not less than 10 percent of oil.

A manufacturers' estimate places the total annual production of tanner's egg yolk in the United States at 10,000 to 12,000 barrels, or 5,500,000 to 6,500,000 pounds per year.

Shipments consisting in whole or in part of inedible or spoiled eggs are classified under the terms of the Federal Food, Drug, and Cosmetic Act as adulterated eggs. Interstate shipments of tanner's egg yolk or similar products made from inedible eggs are required by law to be denatured in such a way that they cannot be used for food purposes.

DRESSING FOR LEATHERS AND FURS

Because of its excellent emulsifying power, tanner's egg yolk is one of the most effective materials used in fat-liquoring, a method employed for incorporating oils and fats by drumming the leather in an emulsion of oil in water. This is especially true in the making of suede and white leathers and to a lesser degree for other leathers, such as grain-finished calf leather. Large quantities of egg yolk are also incorporated directly into tanning formulas.

In the dressing of fur skins, egg yolk finds a somewhat similar application. It is sometimes rubbed directly into the flesh side of the tanned skin, being used either alone or with mixtures of oils.

INDUSTRIAL EGG ALBUMEN

Egg albumen is used for seasoning in finishing certain types of leather, particularly glazed colored stock. The advantage of egg albumen over blood albumin is its freedom from color and iron. The albumen fixes the dyestuffs used, to a certain extent, and from the heat of drying and glazing it is coagulated, thus producing on the surface of the leather a more or less insoluble film. It is used also to season gold-beater's skin, drum heads, and banjo heads, and as an adhesive for a variety of purposes, including the attaching of gold lettering and gold and silver leaf to leather.

Egg albumen is also a vehicle for ammonium or potassium dichromate in sensitizing zinc or aluminum plates for offset work, such as the printing of maps. It is used in the preparation of a substratum for collodion wet-plate negatives used in photography, as a constituent of some ivory substitutes, and for albumen colors in textile printing, in which the dye is mechanically held to the fiber by virtue of the coagulated albumen.

FEED AND FERTILIZER

In point of quantity, more spoiled eggs are used for hog feed and for fertilizer than for tanning and the arts. Certain kinds of rots and breaking-plant and incubator refuse are disposed of locally as feed for hogs. This material is rich in proteins and if decomposition has not progressed too far is readily eaten by the animals. It may be fed in mixtures with grain or other feeds. The quantities of eggs rejected in packing are usually insufficient to warrant their use in the manufacture of tankage.

TANNER'S EGG YOLK

Tanner's egg yolk is one of the important inedible-egg products. In the United States the term "tanner's egg yolk" usually refers to a product made with the whole egg, not including the shell, and does not comprise, as the name implies, the yolk only. The term, however, may be used loosely at times to mean a product made from imperfectly separated yolks and whites as well, or one consisting of yolks completely freed from the whites.

Tanner's egg yolk is made from those eggs, of both the hen and duck, that are unfit for human consumption but do not have a repulsive odor. The principal sources of these eggs are the "rejects" from dealers and cold-storage holdings and the infertile eggs of hatcheries. These include eggs graded as white rots, blood rings, green whites, moldy shells, stuck yolks, sour eggs, and eggs with an abnormal odor. Checks, cracks, and leakers of edible grade may be included at times, and also good eggs when bad ones have been broken with them.

Liquid tanner's egg yolk is made simply by thorough mixing of the whole deshelled egg with a suitable preservative. This must be done promptly after the eggs are broken out of the shell, in order to avoid decomposition and material loss of emulsifying properties.

SALTED AND SALT-FREE YOLK

In the trade there are two broad types of liquid tanner's egg yolk, defined by the methods used for preservation. These are known as salted egg yolk and saltless, or salt-free, egg yolk. For many years practically all liquid tanner's egg yolk was of the first type, being preserved with common salt. The quantity of salt used for this purpose varies from one-sixth to one-fourth of the weight of the deshelled eggs. Probably the most extensively used proportions are 20 pounds of salt to 100 pounds of eggs.

Producers of chrome-tanned leather who desire to blend egg yolk with natural oils for the fat-liquoring, or incorporation of oils, in leather often demand a yolk product without a high salt and ash content. Large quantities of salt in the egg yolk reduce the stability, or permanence, of the oil emulsions.

Egg yolk of the so-called salt-free type is kept from spoiling by the use of preservatives more powerful than salt. In preparing the salt-free yolk, the preservative is dissolved and added in quantity of water equivalent to the weight of salt used for the salted yolk. Therefore, a given weight of either type contains the same quantity of egg. This procedure has been followed for convenience in adjusting price and in using these products.

The quantity of salt necessary for preservation may be reduced materially by adding small quantities of borax, boric acid, sodium benzoate, or sodium fluoride. Another method of preservation consists in rendering the yolk strongly acid with lactic or phosphoric acid and then adding 5 to 6 percent of salt. The acid in the yolk must be neutralized prior to use. Desiccation is also employed.

Within the last few years tanners have been demanding that egg yolk comply with certain requirements. As a rule, liquid salted egg